

linking strings of Java program to the same linking identifier.

REMARKS

The Office Action of September 8, 2005 rejected all pending claims 17-32. Claims 17, 19-20, 24-26, and 29 have been amended. Claim 18 has been cancelled. Applicants respectfully request reconsideration of the rejections.

Claim Rejections under 35 USC §112

Claims 19 and 20 were rejected under 35 USC §112, first paragraph as failing to comply with the written description requirement. The claims have been amended to correct the problems as suggested by the examiner.

Claim 19 was also rejected under 35 USC §112, second paragraph, as indefinite. The informality was corrected.

Claim Rejections under 35 USC §103

The Office Action rejected original claims 2-4, 6, 7, 9-11 and 13-15 under 35 U.S.C. 103(a) as being unpatentable over International Publication WO 00/46667 (Schwabe) in view of U.S. Pat. No. 5,764,987 (Eidt). The Applicant respectfully submits that all of the claims patently distinguish over the cited references. Independent claims 17, 24, and 29 all require the use of a parameterized hashing function to map symbolic linking strings to linking identifiers. The Schwabe reference relates to a system for downloading code to a resource constrained computer. The Office Action concedes that Schwabe does not disclose the use of a hash function to map standard Java symbolic linking strings onto linking identifiers. The Office Action contends, however, that the Eidt patent would have taught those skilled in the art to modify Schwabe to use hashing as claimed. The Eidt patent describes an optimization for faster symbol lookup during linking. It teaches the use of generic hash functions to achieve this. As clashes (several symbolic names mapping to the same token entry) may occur with generic hash functions. Eidt also

explains a clash resolution process involving Export Chain Table and Export Symbol Table, see col. 12 of Eidt. Eidt does not teach or suggest the use of a parameterized hash function. In a parameterized function there are no clashes or collisions where the quantity being hashed maps onto more than one hash value. The section of Eidt cited, col. 13, lines 13-35 does not discuss how to parameterize the hash function. It merely shows how the generic hash function is done.

The term "parameterized hash function" is well known in mathematics. The term is for instance used in exactly the same way in the following web site:

www.nist.gov/dada/html/hash.html, which is reproduced herein in its entirety:

"hash function

(algorithm)

Definition: A function that maps keys to integers, usually to get an even distribution on a smaller set of values.

Specialization (... is a kind of me.)

different kinds: linear hash, perfect hashing, minimal perfect hashing, order preserving minimal perfect hashing, specific functions: Pearson's hash, multiplication method.

Aggregate parent (I am a part of or used in ...)

hash table, uniform hashing, universal hashing, Bloom filter.

See also simple uniform hashing.

Note: The range of integers is typically [0... m-1] where m is a prime number or a power of 2.

Author: PEB

Implementation

See the implementations at minimal perfect hashing (C++ and C) and Pearson's hash (C). A fast, parameterizable, broadly applicable hash function (C) including code for and evaluations of many other hash functions. A review and comparison of many integer hash functions (C). Overview of different kinds of hash functions. Arash Partow's hash functions (C, C++, Pascal, Java). Fowler/Noll/Vo or FNV hash function (C). Hash functions for strings (C) and (C and Perl). Kazlib (C).

More information

Hashing Functions.

Go to the Dictionary of Algorithms and Data Structures home page.

If you have suggestions, corrections, or comments, please get in touch with Paul E. Black.

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<http://www.nist.gov/dads/HTML/hash.html>"

In our application area (embedded control systems/smart cards), there is simply no space for the two tables of Eidt. Hence, we tailor the hash function to the application domain, such that there can be no clashes. We do this by not using a general hash function, but by parameterizing some suitable hash functions. Claims 17, 24 and 29 have all been amended to require the use of parameterized hash functions. All we then need to ensure uniqueness of the symbol to token

mapping is to store the parameter (our "converter" needed to achieve this uniqueness) in our load data structures (the "cap file").

The Office Action contends that one skilled in the art would use the hash function of Eidt to map symbolic linking strings to linking identifiers or tokens because "hashing the export symbols considerably increases the speed of searching for and importing the symbols." However, increasing speed is not the function of the hash function of claims 17, 24 and 29. In determining obviousness, the claims must be considered as a whole and that means that the problem solved by the invention must be considered. Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. ATD Corp. v. Lydall, Inc., 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed. Cir. 1998). There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. See Ruiz v. A.B. Chance Co., 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000); ATD Corp., 159 F.3d at 546, 48 USPQ2d at 1329; Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc., 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994) ("When the patented invention is made by combining known components to achieve a new system, the prior art must provide a suggestion or motivation to make such a combination.").

The Office Action states that: "the fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would have been obvious." That statement indicates that the examiner misunderstood that there is no basis for the combination. To avoid the insidious temptation to use hindsight the law requires that there is some evidence of a teaching, suggestion, or motivation to combine the references. Taking the applicant's claims and finding references that teach the individual elements and then combining them by finding a reason to

combine that is unrelated to the problem solved by the applicant's invention is not the test for infringement. To do the foregoing is the essence of prohibited hindsight. See Dembiczak, 175 F.3d 994 (Fed. Cir. 1999). The problem solved by applicant's invention must be considered in determining whether to combine references, not an unrelated problem. Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931 (Fed. Cir. 1990); Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675 (Fed. Cir. 1988). The examiner must show reasons that the skilled artisan confronted with the same problems as the inventor would select the elements from the cited prior art references and combine them in the manner claimed. In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998). The problem solved by applicant's invention is to use a less space-consuming expression of symbolic linking strings. See paragraph 0012 of the subject patent application. Eidt is not concerned at all with consuming less storage space. In fact, Eidt uses an Export Chain Table and an Export Symbol table that consumes substantial amounts of storage space and is thus not suitable for reducing storage space (the problem addressed by applicants' invention). Therefore, those skilled in the art would not have been motivated to use the storage-space consuming approach of Eidt in a system such as Schwabe's.

Claims 18-23, 25-28 and 30-32 are dependent on their respective independent claims and are patentable for at least the same reasons discussed herein.

For the foregoing reasons, Applicant respectfully requests entry of the amendment and allowance of the pending claims.

Respectfully submitted,

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I hereby certify that this Amendment and Response to Office Action, and any documents referred to as attached therein, are being deposited with the United States Postal Office on the date below with sufficient postage as first-class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Date: December 7, 2005.

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